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**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Application Number: 10/561,290
Filing Date: December 20, 2005
Appellant(s): MERRY, RICHARD P.

Gregory D. Allen
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 07/15/09 appealing from the Office action mailed 01/26/09.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

| | | |
|---|---|---|
| 4,999,168 | Ten Eyck | 03-1991 |
| 5,290,522 | Rogers et al. | 03-1994 |

Applicant's admission of prior art. Instant specification, Page 1-2.

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 21-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ten Eyck (U.S. 4,999,168) in view of Rogers et al. (U.S. 5,290,522).

Regarding claim 21, Ten Eyck discloses a pollution control element (Fig. 1) with a three layer intumescent mounting sheet, (26, 22, 24) around an exhaust monolith (i.e. exposed to the atmosphere, C1, L1-10). The first layer, adjacent to the monolith, 26, is a non-intumescent,

ceramic fiber layer designed to protect the adjacent intumescent layer, 22, from the high heats generated by the monolith (C5, L1-20). The third layer, 24, is a non-intumescent reinforcing layer of inter alia, inorganic fibers, which lies between the intumescent layer, 22, and the outer mounting device, 10, and thereby provides a degree of thermal protection from the relatively lower ambient temperature (C4, L60-68 and C5, L49-65). The intumescent layer, **22**, has a thickness of 0.2 inches and density of 70 pcf (i.e. 5696.2 g/m^2, C5, L10-20). Ten Eyck does not disclose the surface density of the non-intumescent layer.

Rogers et al. discloses a non-intumescent inorganic fiber mat with beneficial cushioning and thermal protection properties for use with monolith exhaust systems (Fig. 1, C2, L35-51). The mounting mat of Rogers et al. is disclosed as solving the problem of inadequate surface density in fibrous mats through needlepunching to achieve surface densities of greater than 2000 g/m^2 (C2, L50-68 and C6, L 27-32).

The inventions of both Ten Eyck and Rogers et al. are drawn to the field of catalytic monolith mounting mats and therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the three layer mat of Ten Eyck by using the inorganic fiber mat material of Rogers et al. as the non-intumescent layer material for the purposes of imparting enhanced thermal holding properties (Rogers et al. C2, L35-51).

Regarding claims 22-39, modified Ten Eyck discloses all of the limitations as set forth above. Additionally, Rogers et al. discloses that the fibrous mat has shot-free, inorganic, ceramic fibers (C1, L60-68) with needlepunching resulting in high surface density (i.e. greater than 2000 g/m^2, C2, L60-65). Ten Eyck discloses that the surface density of the intumescent layer is

greater than 2000 g/m^2 (i.e. 5696.2 g/m^2, 0.2 inches thick with a density of 70 pcf, C5, L10-20) and the overall thickness of the mat is between 3 and 30 mm (C6, L30-68).

Regarding the relative thicknesses of the intumescent and non-intumescent layers, one having ordinary skill in the art would have adjusted, through routine experimentation, the relative thicknesses of the layers in the mounting mat, in order to optimize the mounting strength, thermal conduction properties, cost of manufacturing and thermal holding properties. Given the surface density properties of the materials disclosed for use in the layers, and after optimizing the relative thicknesses, the overall density of the three layer laminate would be within the claimed range.

Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ten Eyck (U.S. 4,999,168) in view of Rogers et al. (U.S. 5,290,522), and further in view of applicant's admission of prior art.

Regarding claim 40, modified Ten Eyck discloses all of the limitations as set forth above. Modified Ten Eyck does not disclose the particular properties of the catalytic monolith used. In applicant's specification, Page 1 L20-30, it is disclosed that monoliths with walls of 6 mils and cell densities of 400 were known to those having skill in the art at the time of the invention. It would have been obvious to one having ordinary skill in the art to have used the mounting sheet of modified Ten Eyck for all applicable exhaust mounting systems and for all monoliths in order to maximize the commercial applicability of the invention. The improved thermal holding characteristics of the mounting sheet of modified Ten Eyck would make it particularly applicable

to the thin walled and increasingly fragile monoliths described in the instant specification (Page 1, L30-Page 2, L15).

**(10) Response to Argument**

Appellant argues against the combination of Ten Eyck and Rogers et al. on the grounds that they teach away from each other because they teach reinforcing layers (i.e. non-intumescent layers) of differing thicknesses. This is not the case. Neither reference teaches that the reinforcing layer **needs** be limited to some specific thickness.

In Ten Eyck, the thickness parameters are always disclosed with qualifying language such as "can have a thickness..." or "preferred" (See for example, C3, L60-67). Thus the thickness of Ten Eyck is never specifically limited. Taking the reference as a whole, one having ordinary skill in the art would conclude that the reference lists several **preferred** thicknesses which are between 3 and 7 mils as non-limiting examples. One having ordinary skill would also conclude that the only necessary limitations made on the reinforcing layer are based on it functionality, not its specific size: "other ceramic fiber forms such as blanket, mat or felt may be employed [as a reinforcing layer], provided they impart the necessary thermal insulation and mechanical support" (C5, L15-20). Hence, the size, shape and thickness of the non-intumescent reinforcing layer is not limited in Ten Eyck.

In Rogers et al., thickness parameters are never disclosed as being required to the inventive reinforcing layer. The only mention of thickness in Rogers et al. is at C6, L27-32, where a thickness range of 0.5-3 cm is listed as a **preferable** range, and through out the examples (C6, L50-C9, L40), where several specific thicknesses of reinforcing materials are used in different embodiments. As with Ten Eyck, one having ordinary skill in the art would not

consider the Rogers reference to have any required thickness parameter. Rather, the reference teaches a general reinforcing layer to be used in a catalytic converter of any automobile (as in Ten Eyck) to "tightly but resiliently support" the catalytic element (C3, L10-22). Again, the size, shape and thickness of the reinforcing layer is not critical in Rogers et al.

Because neither reference requires a specific thickness, appellant's argument that the two references teach away from each other because of different thickness is without merit. The use of different thicknesses in **preferred embodiments** and **non-limiting specific examples** does not preclude the two references from being combined and does not provide a basis to argue that the two references teach away from each other. The motivation to combine the references in order to improve the cushioning and thermal protection properties of the reinforcing layer is proper.

Appellant argues that there was hindsight reasoning in the combination; however this is not the case. The Ten Eyck reference teaches a catalytic support that uses a two reinforcing layers sandwiching an intumescent layer to support a catalytic converter for an automobile (C5, L15-20). Rogers et al. discloses reinforcing layer with superior density (i.e. support) and thermal holding qualities (C2, L35-67) for supporting catalytic converters in automobiles (C3, L10-22). The combination of the two references is based solely on the disclosure of the two references and is without any added motivation from the examiner, hindsight or otherwise.

Appellant greatly stressed the fact that the Rogers et al. reference has a thickness that is 9 times as big as the thickness of Ten Eyck. The examiner notes that the appellant is comparing two specific embodiments of the two references to arrive at this number.

Appellant argues that even though Ten Eyck doesn't require a thin reinforcing layer, it does generally teach thin reinforcing layers. First, the examiner notes that, as explained above above, a general teaching of a thin layer does not preclude the use of a thick layer and does not prohibit the combination. Secondly, Ten Eyck includes implicit examples which do not generally teach "thin" reinforcing layers. In Ten Eyck, the overall sheet (including the two reinforcing layers and the intumescent layer) is disclosed as being as thick as 5 inches (C3, L63-64). The intumescent layer is later disclosed as having being up to 25 mm thick (i.e. approx. 1 inch) (C5, L45-50). By subtracting these ranges and dividing by two (because there are two reinforcing layers in the overall sheet) one can calculate that each reinforcing layer would have to be 2 inches thick in order to provide an overall sheet 5 inches thick with an intumescent layer that is 1 inch thick. Hence Ten Eyck actually discloses a reinforcing layer that is 2 inches thick in addition to its preferred disclosure of a thickness of 0.007 inches. Since Rogers et al. discloses a preferred thickness of 0.5-3 cm (i.e. 0.20 to 1.18 inches) the two thicknesses would not teach away from each other even if they were critical to the respective references (which they are not) (C6, L27-32).

Turning now to applicant's arguments against claim 30, the examiner maintains that the relative thickness of the reinforcing layers to the intumescent layers in the overall sheet structure would be a result effective variable to one having ordinary skill in the art. The thickness of the reinforcing layer would be increased to maximize, among other things, its cushioning ability and its ability to control thermal shock between the catalytic converter and the housing. Conversely the thickness would be set to the smallest thickness possible to achieve the necessary properties at the lowest costs. It would be within the ordinary skill in the art to balance the cost/benefits of

different thicknesses for the reinforcing layers of different sized catalytic converters (i.e. those for a compact car as compared to those for an SUV). The examiner also notes that using the ranges of Ten Eyck of the previous paragraph, the intumescent layer has a thickness of 1 inch and the combined thickness of the non-intumescent reinforcing layers was 4 inches (yielding a 5 inch overall thickness). Under this embodiment of Ten Eyck, the thickness ratio is 1/4, which is less than the instantly claimed 1/3.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Michael B Nelson/

Conferees:

/David R. Sample/
Supervisory Patent Examiner, Art Unit 1794

/Benjamin L. Utech/
Primary Examiner